

**Bell Aerospace Company** 

POST OFFICE BOX 1 BUFFALO, NEW YORK 14240

Report No. 8586-950001 A

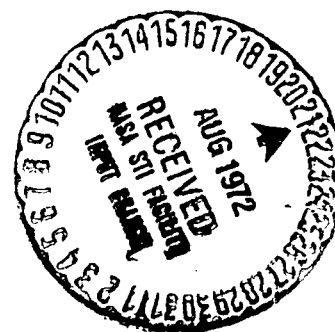
*D. R. A.*TELEOPERATOR TECHNOLOGY
AND
SYSTEM DEVELOPMENTFINAL REPORT
APRIL 1972

VOLUME II

APPENDIX E

CR-123748

(NASA-CR-123748) TELEOPERATOR TECHNOLOGY
AND SYSTEM DEVELOPMENT. VOLUME 2: APPENDIX
1972 43 p
Final Report (Bell Aerospace Co.) Apr.
CSCL 09E
G3/C9
Unclas
15919
N72-31236



D J R H

Bell Aerospace Company DIVISION OF **textron**

POST OFFICE BOX 1 BUFFALO, NEW YORK 14240

Report No. 8586-950001 A

TELEOPERATOR TECHNOLOGY
AND
SYSTEM DEVELOPMENT

FINAL REPORT
APRIL 1972

VOLUME II

APPENDIX E

Prepared Under Contract NAS 8-27021 for

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ASTRIONICS LABORATORY
GEORGE C. MARSHALL SPACE FLIGHT CENTER

CONTROL NO. DCN 1-1-40-10374

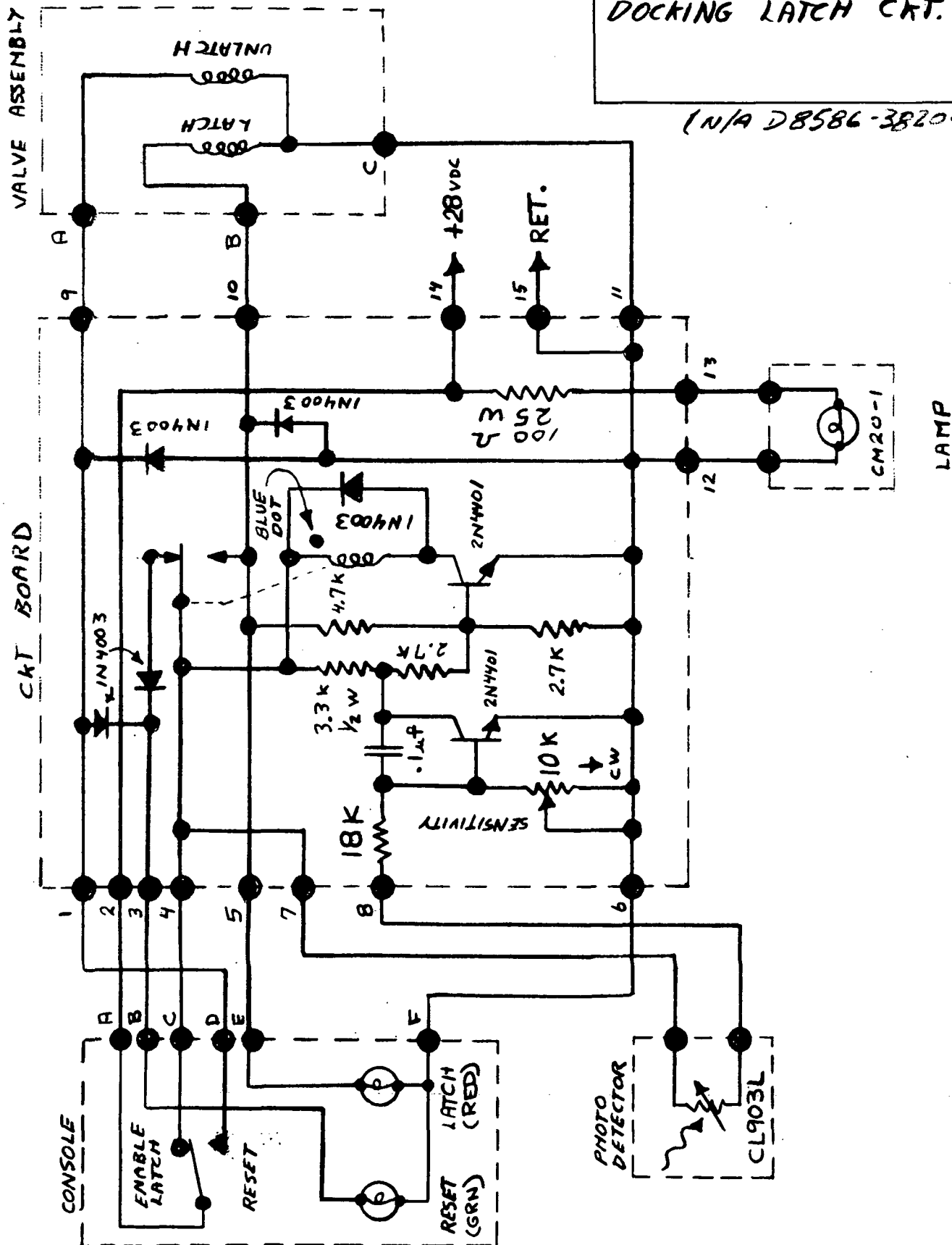
APPENDIX E

This appendix contains drawings of equipment designed and fabricated by Bell Aerospace to affect the integration of the Government furnished Controllers, Displays and Manipulators with the Bell Remote Maneuvering Unit. Schematic diagrams of the Master and Lever controllers are also included for reference.

Because no contractual requirement exists for deliverable drawings, the drawings included herein were not refined beyond the "working drawing" or engineering sketch format.

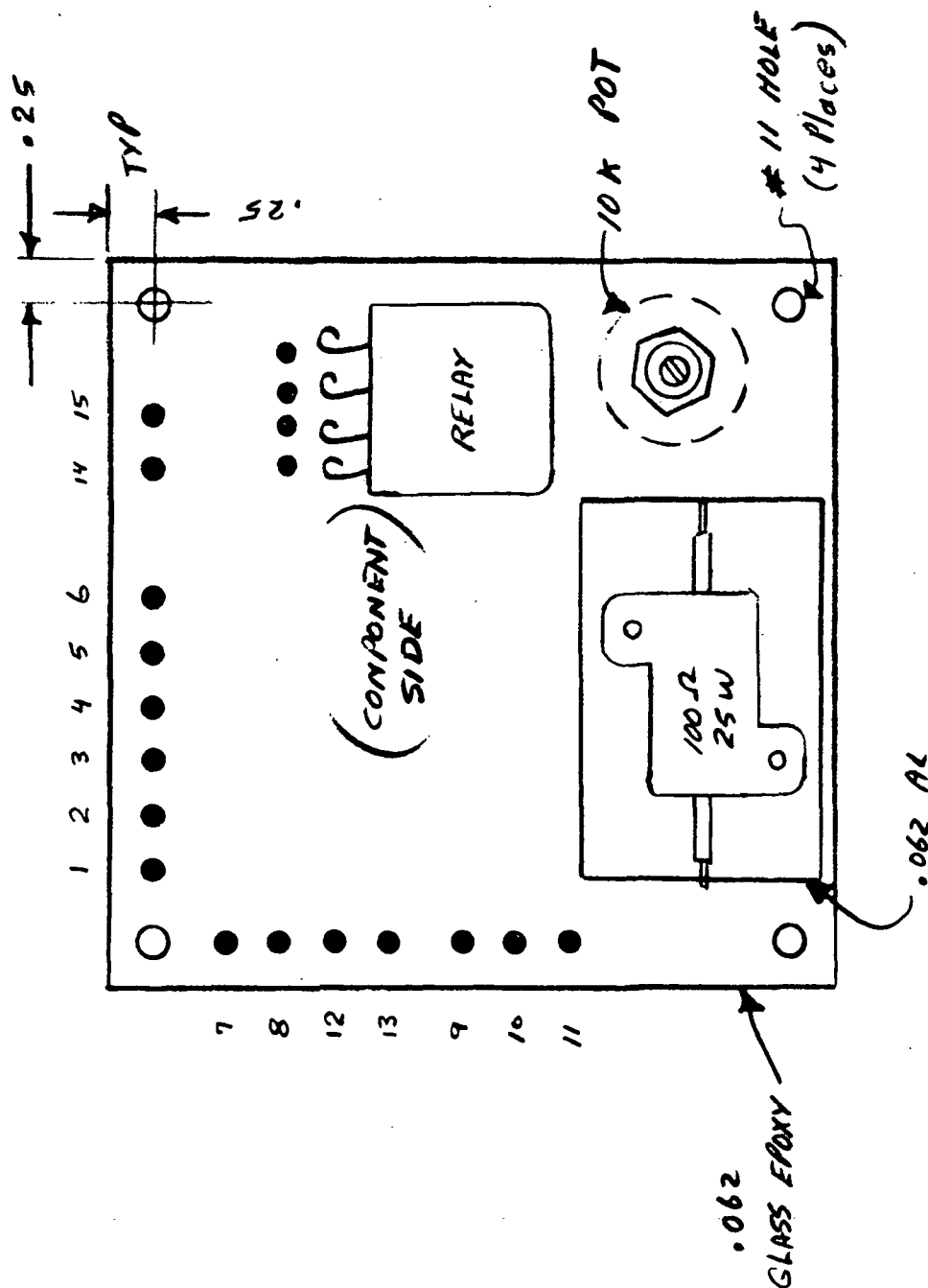
DOCKING LATCH CKT.

(N/A DB586-382047)



**LAYOUT FOR DOCKING
LATCH CKT**

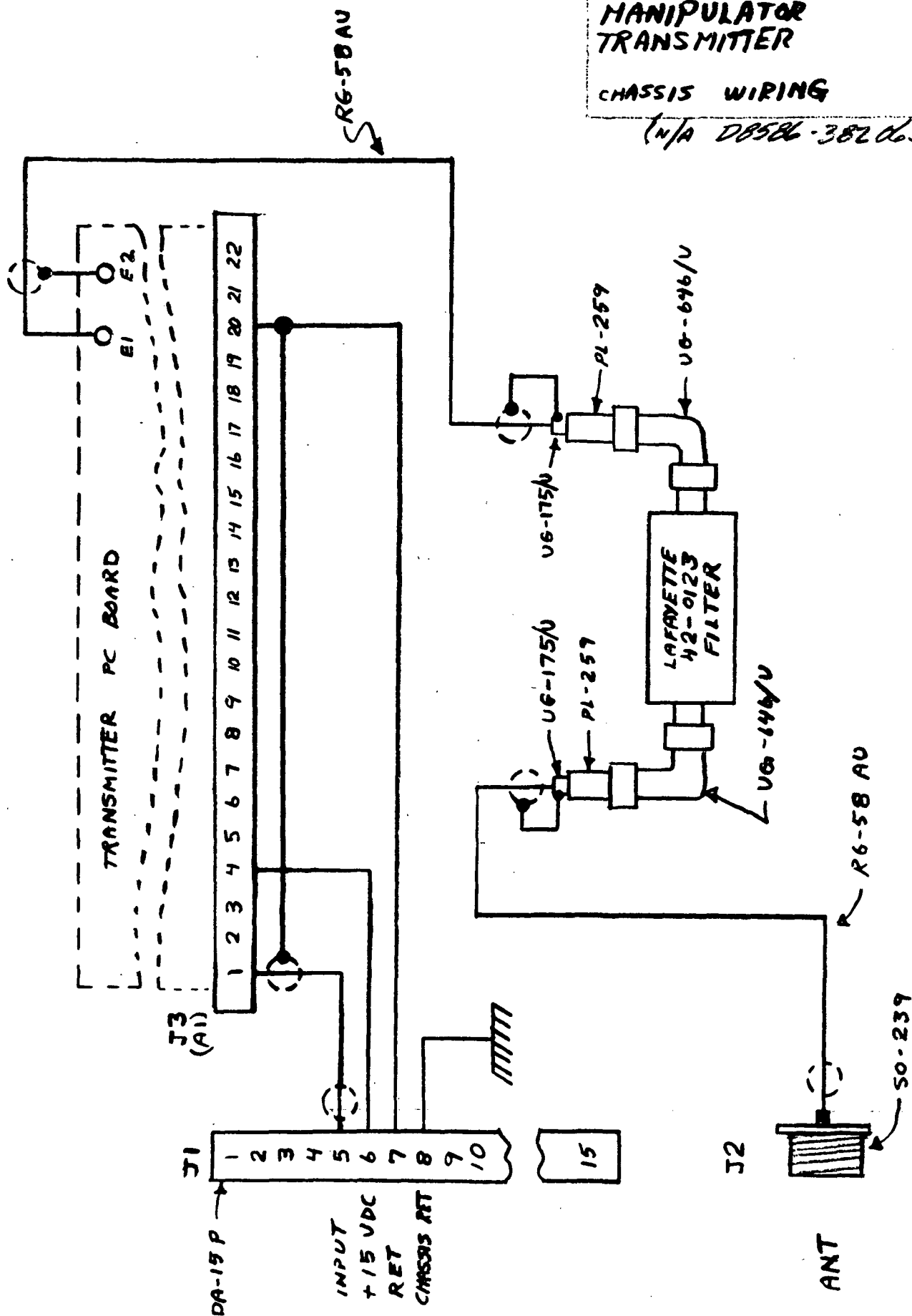
(N/A D8586-382047)



MANIPULATOR TRANSMITTER

CHASSIS WIRING

(N/A D8586-382052)

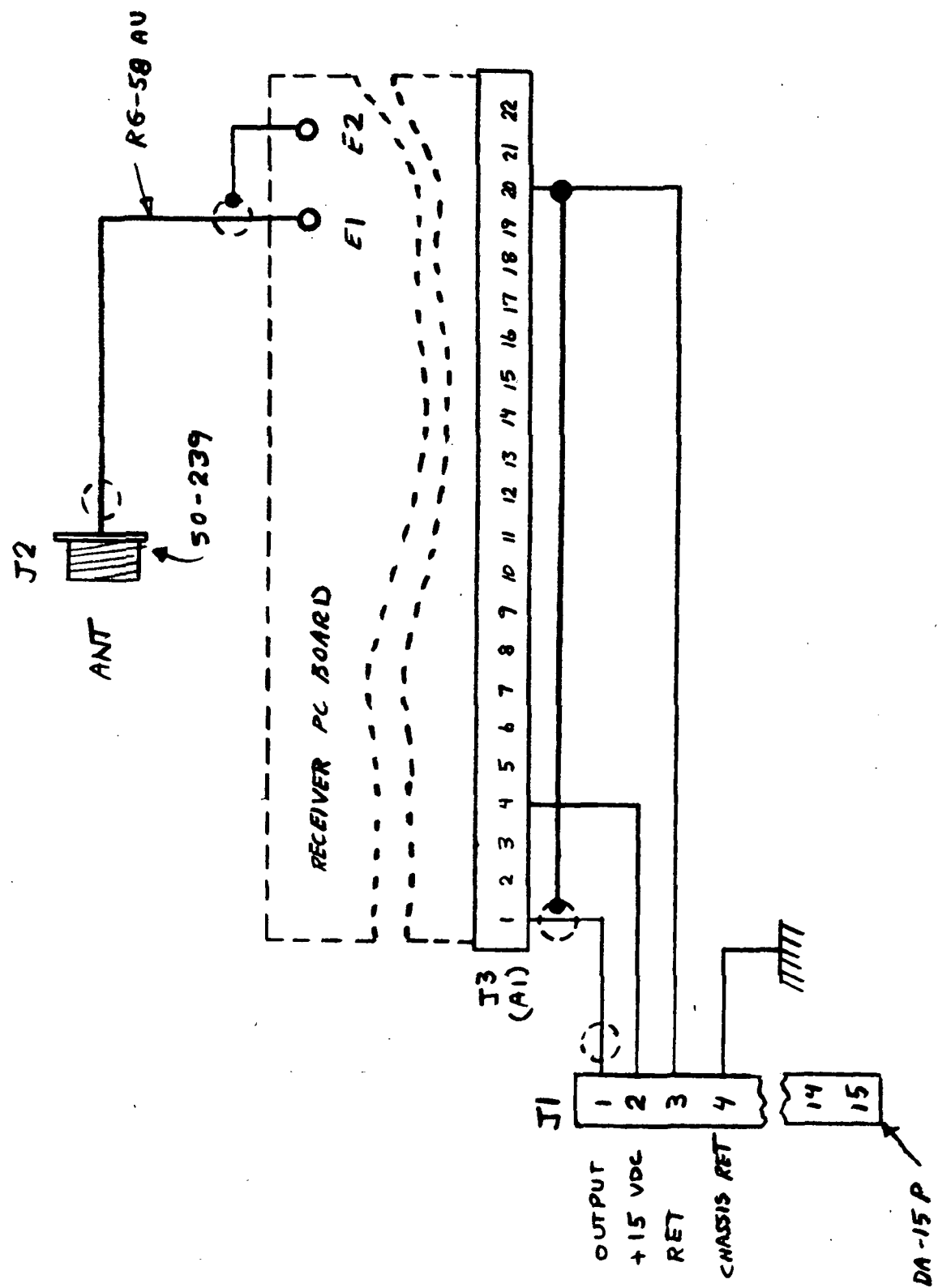


14. *Latha* Date 5-3-71

AEROSPACE TECHNOLOGY

Model _____ Page _____
 Airplane _____ Report D8586-38205

**MANIPULATOR
 RECEIVER**
CHASSIS WIRING
(N/A D8586-382047)



H. Latta

Date 9-30-71

REEL AIRCROSYSTEMS COMPANY

Model

Page

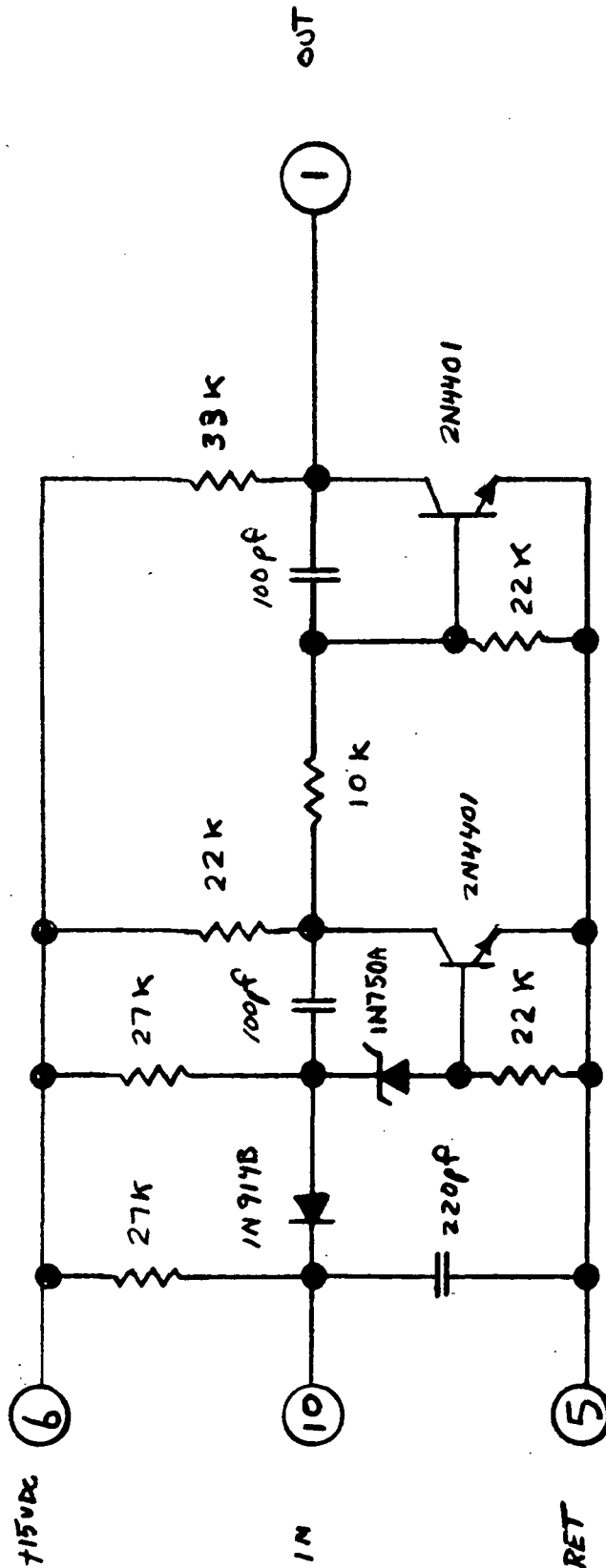
DBSB6-387050

Airplane

Report

MANIPULATOR DECODER
INPUT BUFFER
BOARD A1

(N/A DBSB6-382050)



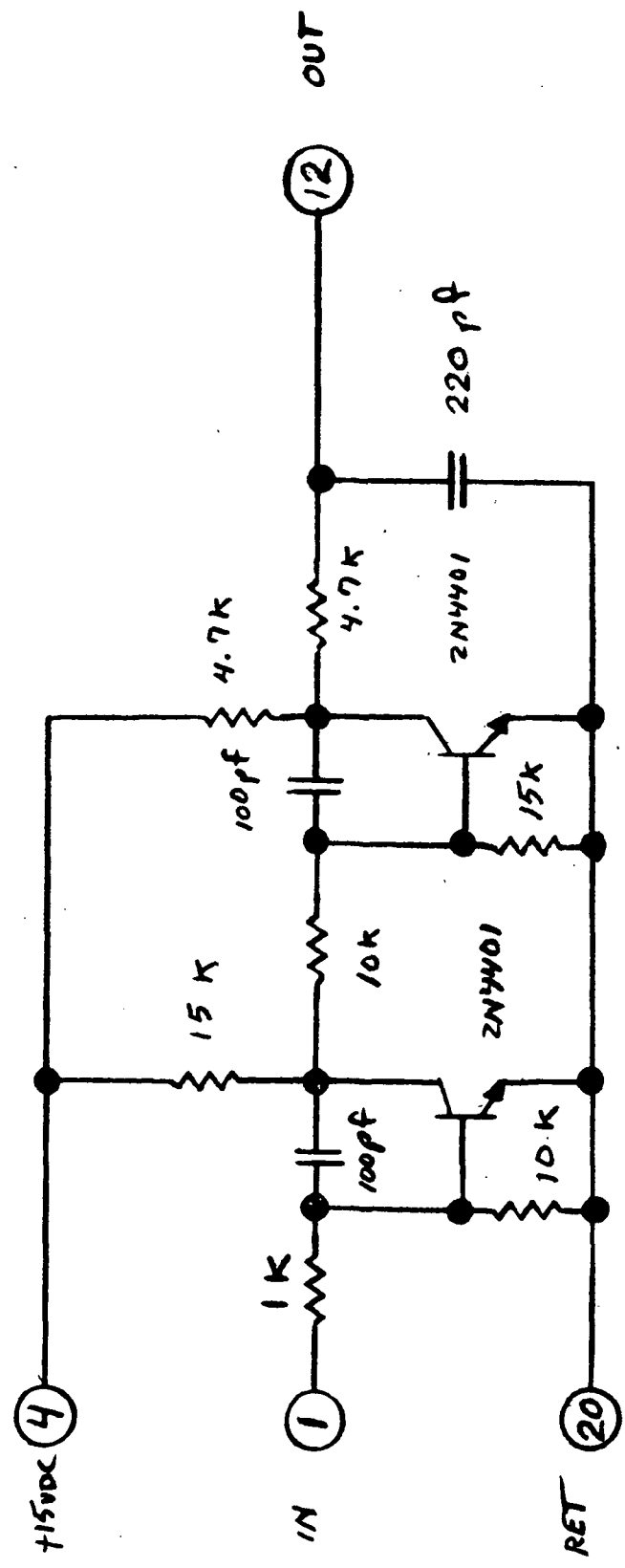
By H. Latta

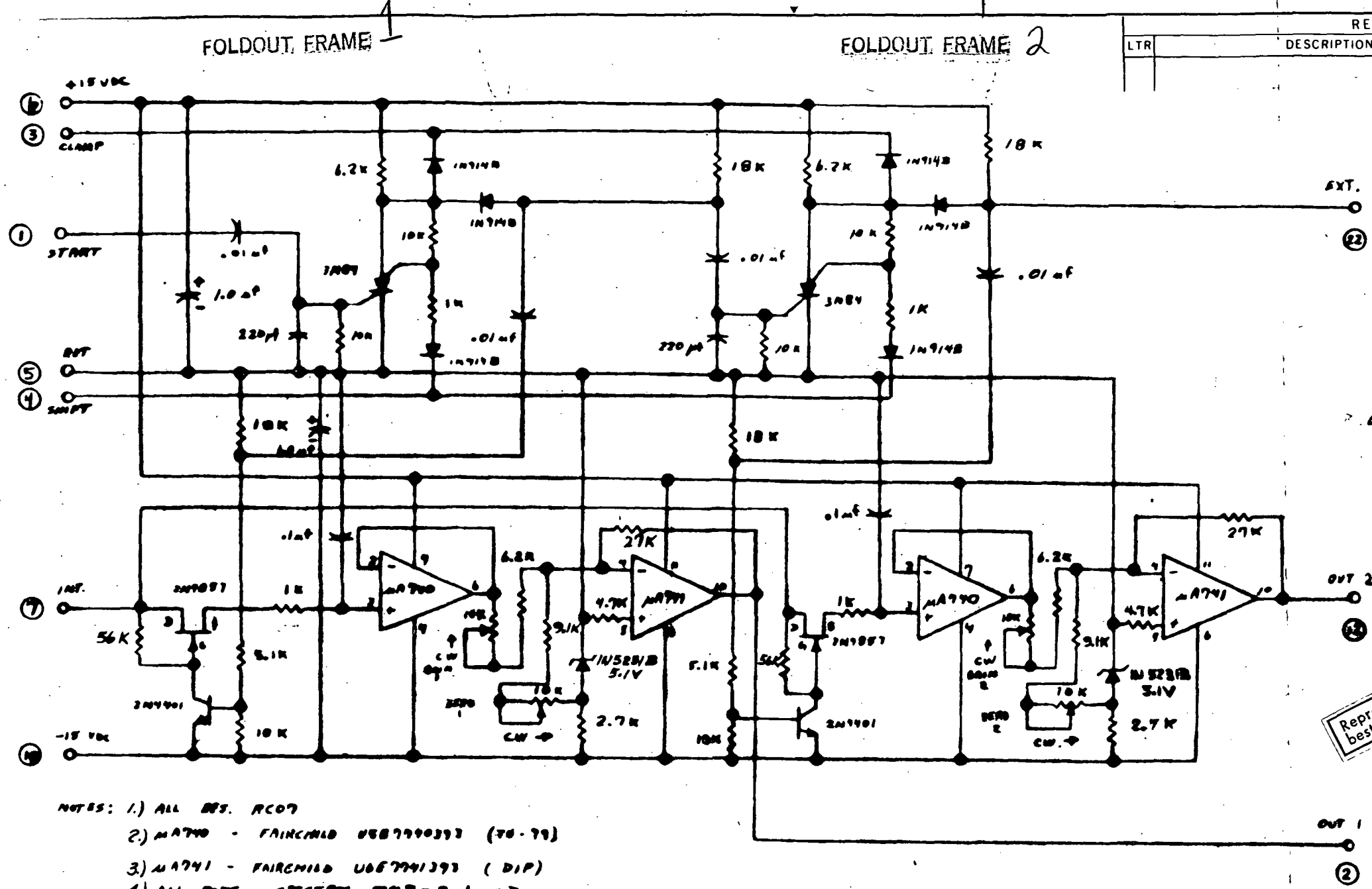
Date 4-30-71

BELL AEROSYSTEMS COMPANY

Model _____ Page DB586-382055
Airplane _____ Report _____

**MANIPULATOR ENCODER
OUTPUT BUFFER
BOARD A1**
(N/A D B586-382051)





QTY REQD		FIND NO	CODE IDENT	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	DRAWING OR SPECIFICATION	MATERIAL OR NOTE	DIA	THK	WD	LG	TS 1000 PSI
PARTS LIST												
HOLE TOLERANCES EXCEPT AS SHOWN												
.013 TO .039 +.004 -.001												
.040 TO .129 +.005 -.001												
.130 TO .250 +.006 -.001												
.251 TO .485 +.008 -.001												
.486 TO .735 +.010 -.001												
.736 TO .985 +.012 -.001												
.986 AND LARGER +.010												
EO TO COMPLETE PRINT												
EO NO EO NO EO NO EO NO												
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ON DECIMALS:												
.X .XX .XXX ANGLES: ±.1 ±.03 ±.010 ± 0° 30'												
UNLESS OTHERWISE SPECIFIED: — BREAK EDGES .015 MAX RAD OR CHAMFER — DIMENSIONING IS PER ANSI Y14.5 — MACHINED SURFACES												
DWN H LATKA 3-15-71												
GP												
APVD												
WT												
CHK gm												
STRESS												
RLSE												
CONTR												
REV STATUS OF SHEETS												
REV SHEET												
BELL AEROSPACE COMPANY												
DIVISION OF TEXTRON INC.												
POST OFFICE BOX ONE												
BUFFALO, NEW YORK 14240												
MANIPULATOR												
DECODER												
BOARD A5 THRU 6 INC A11												
SIZE CODE IDENT NO DRAWING NO												
C 80070 D8586-382060												
SCALE SHEET												

NUMBER	APPLICATION	DASH NO	NEXT ASSY	USED ON	NEXT ASSY	FINAL ASSY
D8586-382050						
APPLICABLE SPECIFICATIONS						

D8586-382060

Rev 10

Date 5-2

BELL AEROSYSTEMS COMPANY

Model

Page

Checked

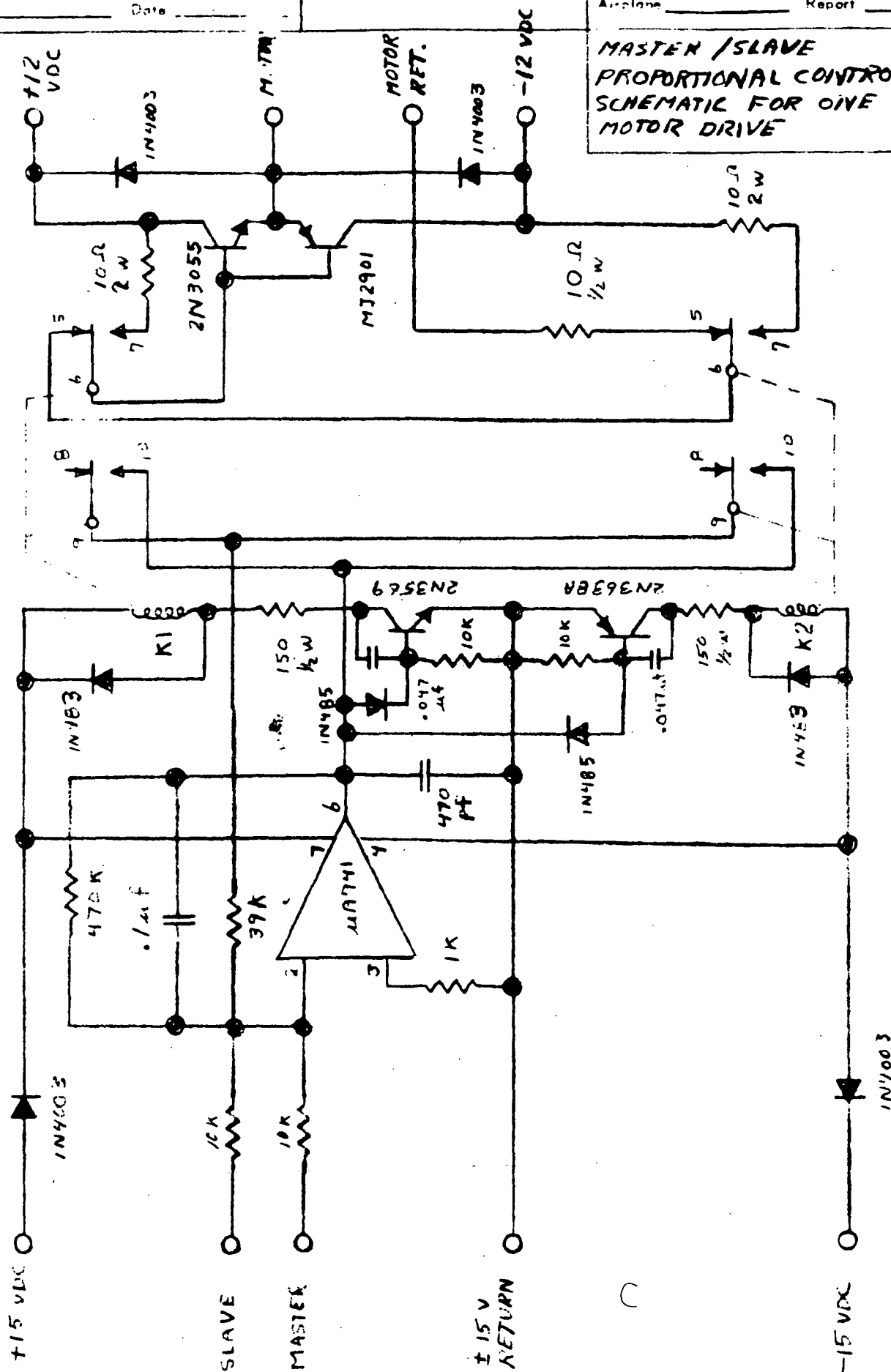
Date

Airplane

Report

**MASTER / SLAVE
PROPORTIONAL CONTROL
SCHEMATIC FOR ONE
MOTOR DRIVE**

Form 0170



JOYSTICK CONTROL -- ELECTRICAL SCHEMATIC (BLOCK DIAGRAM)

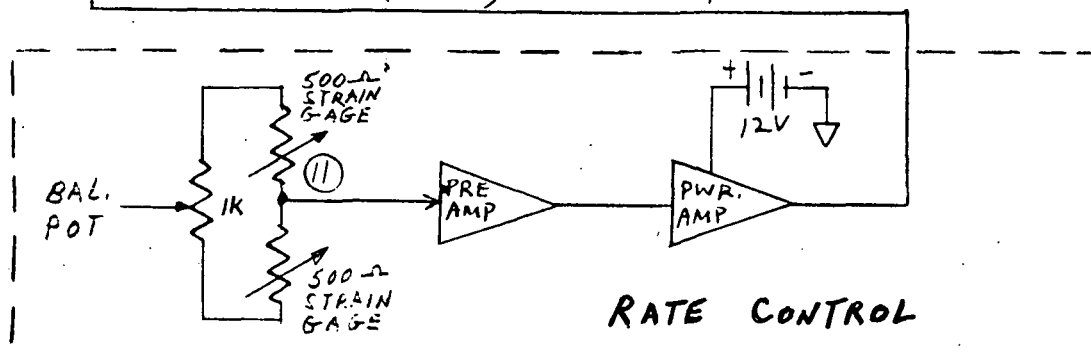
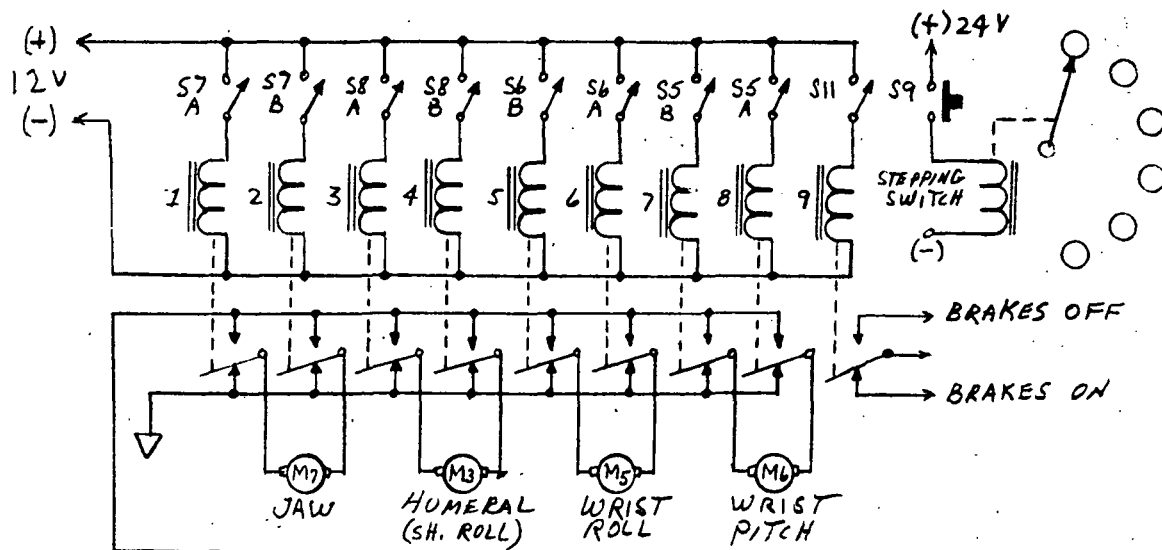
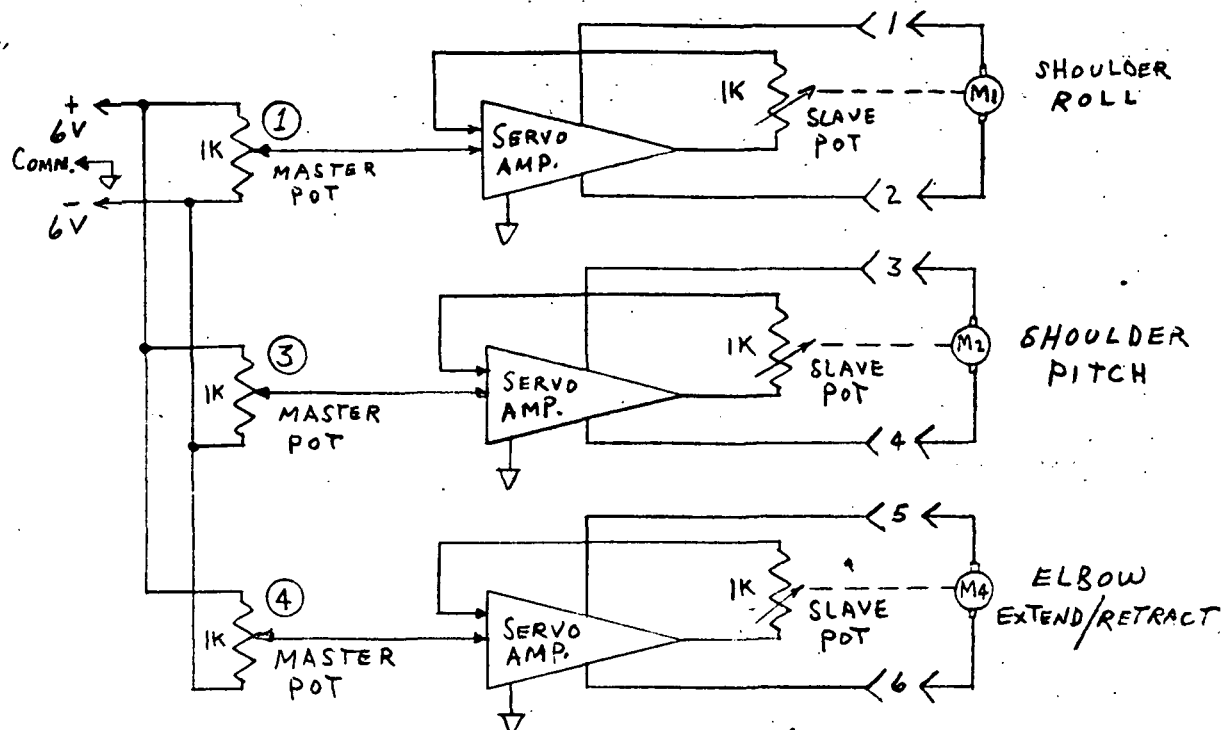
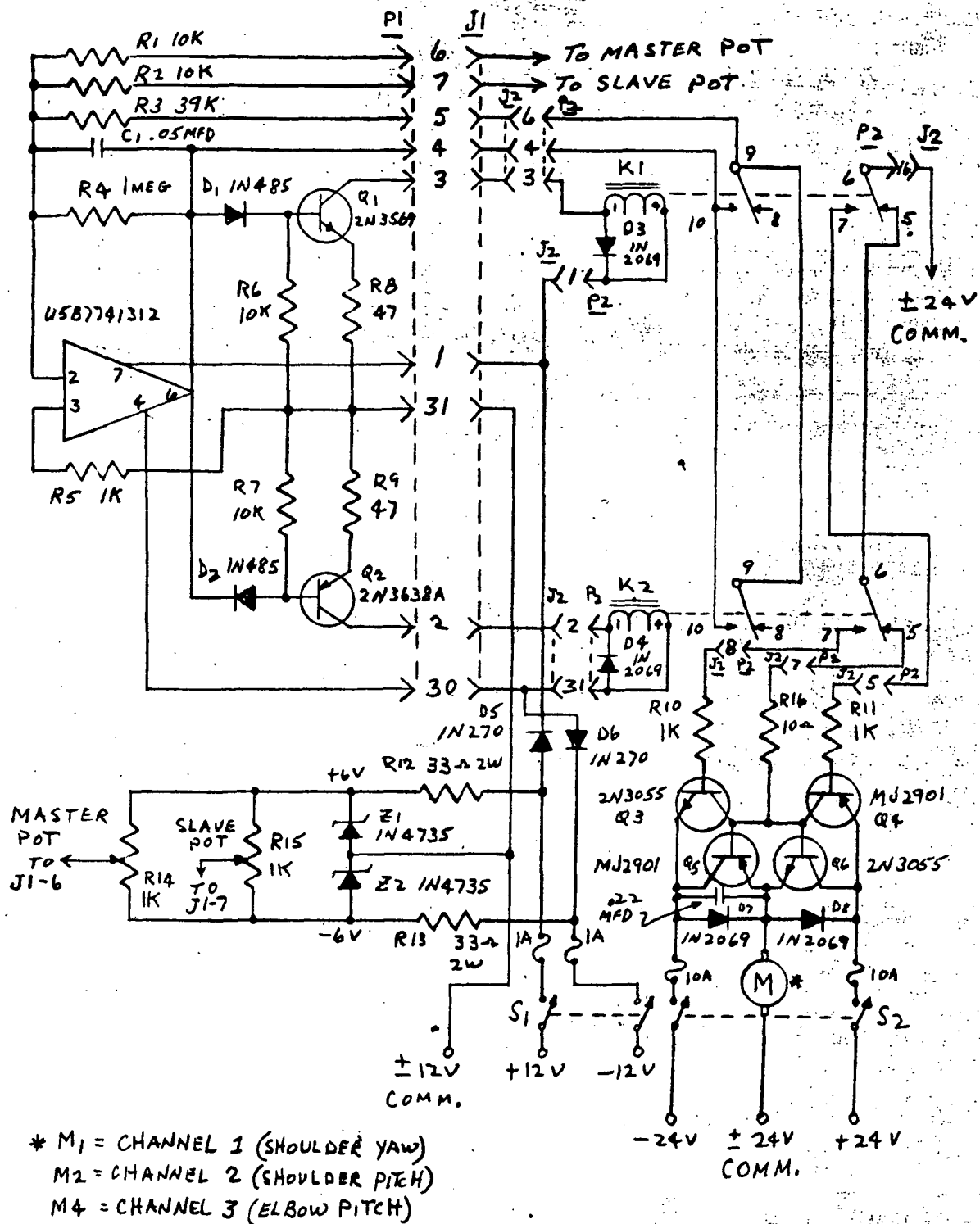


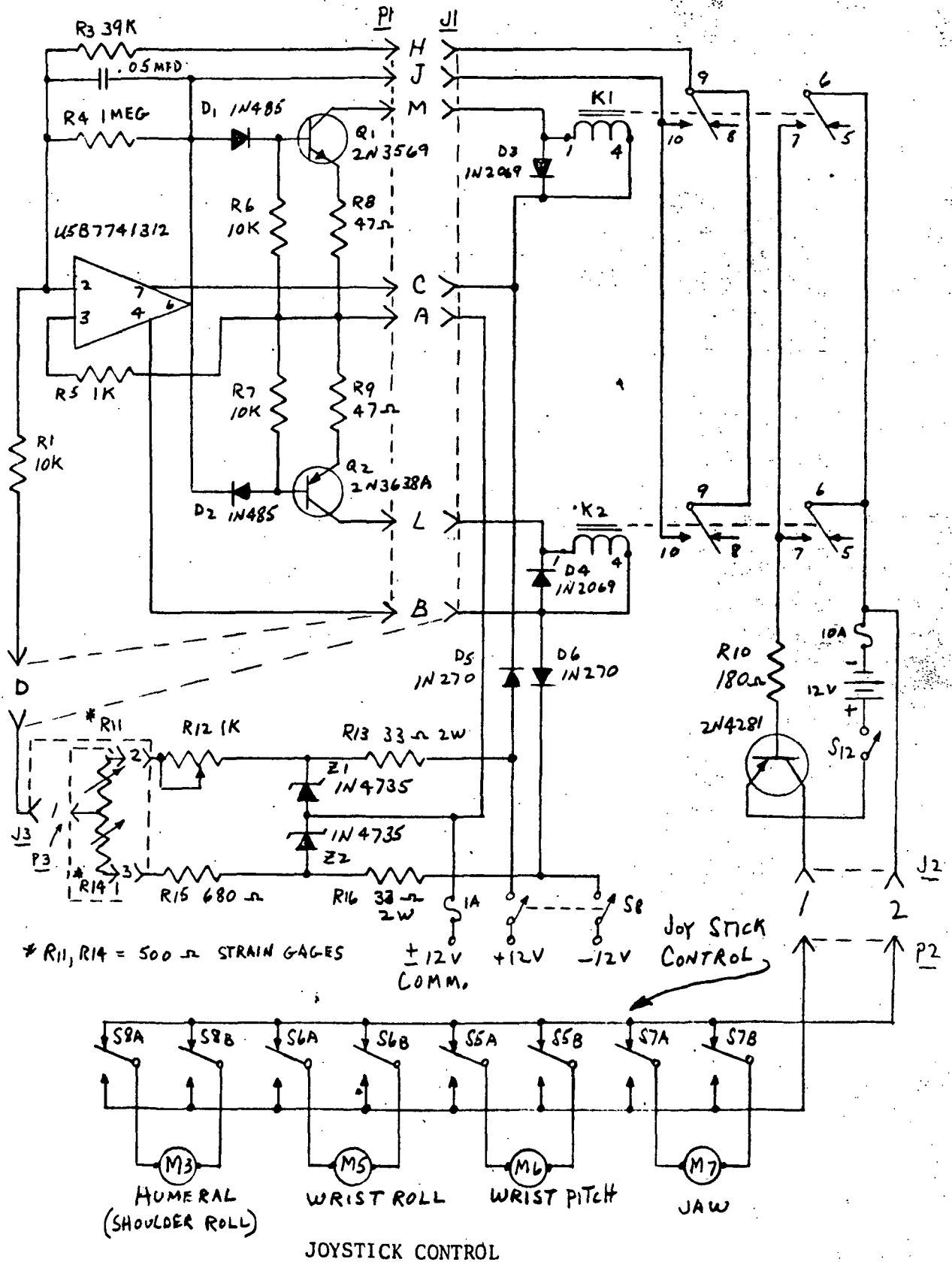
Figure 3



JOYSTICK CONTROL

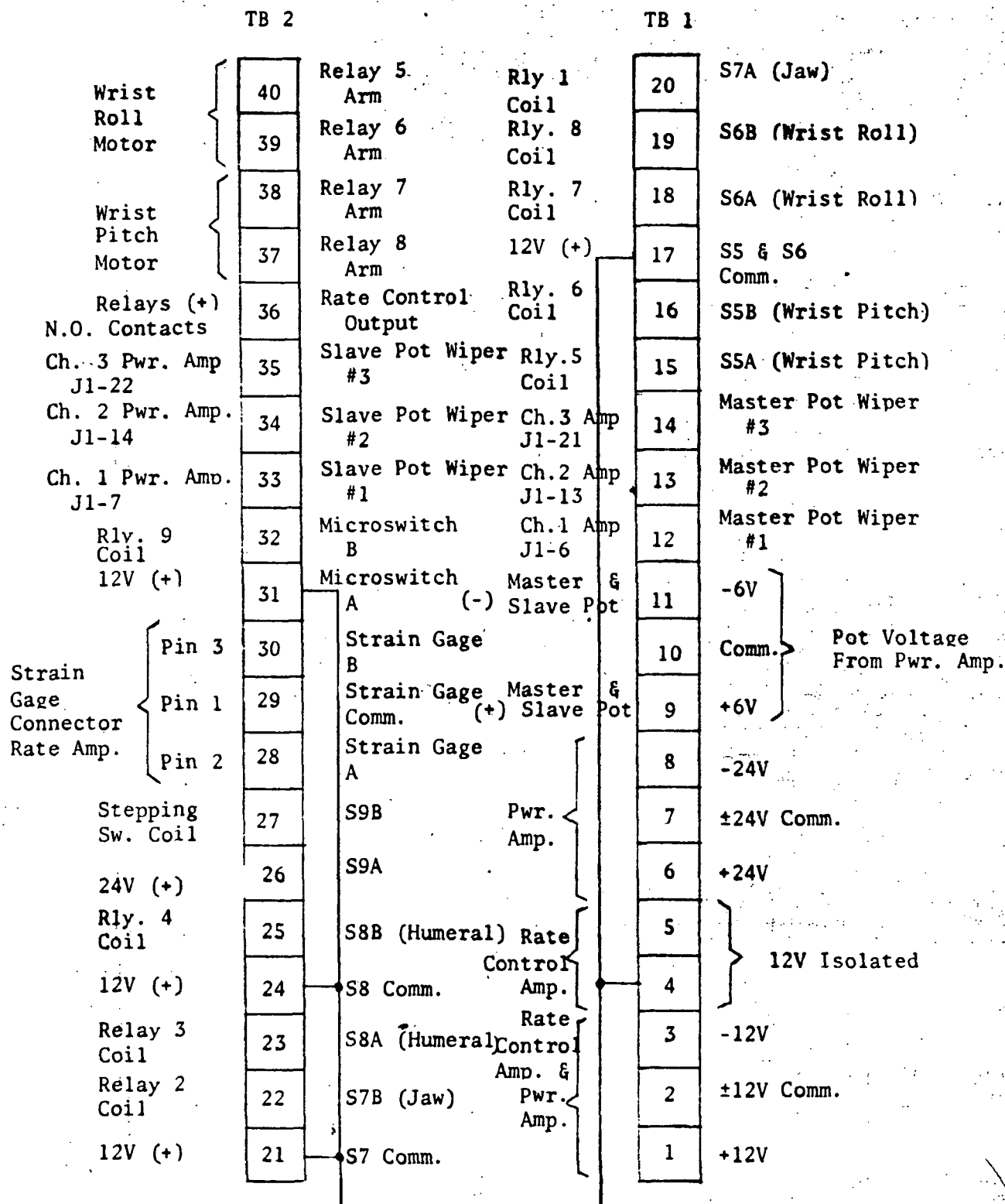
Schematic Diagram - Servo Amplifier. one channel

Figure 4



Schematic Diagram - Rate Control

Figure 5



TERMINAL BOARDS 1 and 2

Figure 6

TB. 3

Ch. 1 Pwr. Amp.		Ch. 2 Pwr. Amp.		Ch. 3 Pwr. Amp.		Relay 3 Arm	Relay 4 Arm	Relay 1 Arm	Relay 2 Arm
41	42	43	44	45	46	47	48	49	50
Shoulder (Yaw) Motor		Shoulder Ext./Ret. Motor (Pitch)		Elbow Ext./Ret. Motor (Pitch)		Humeral Roll Motor (Shoulder Roll)		Jaw Motor	

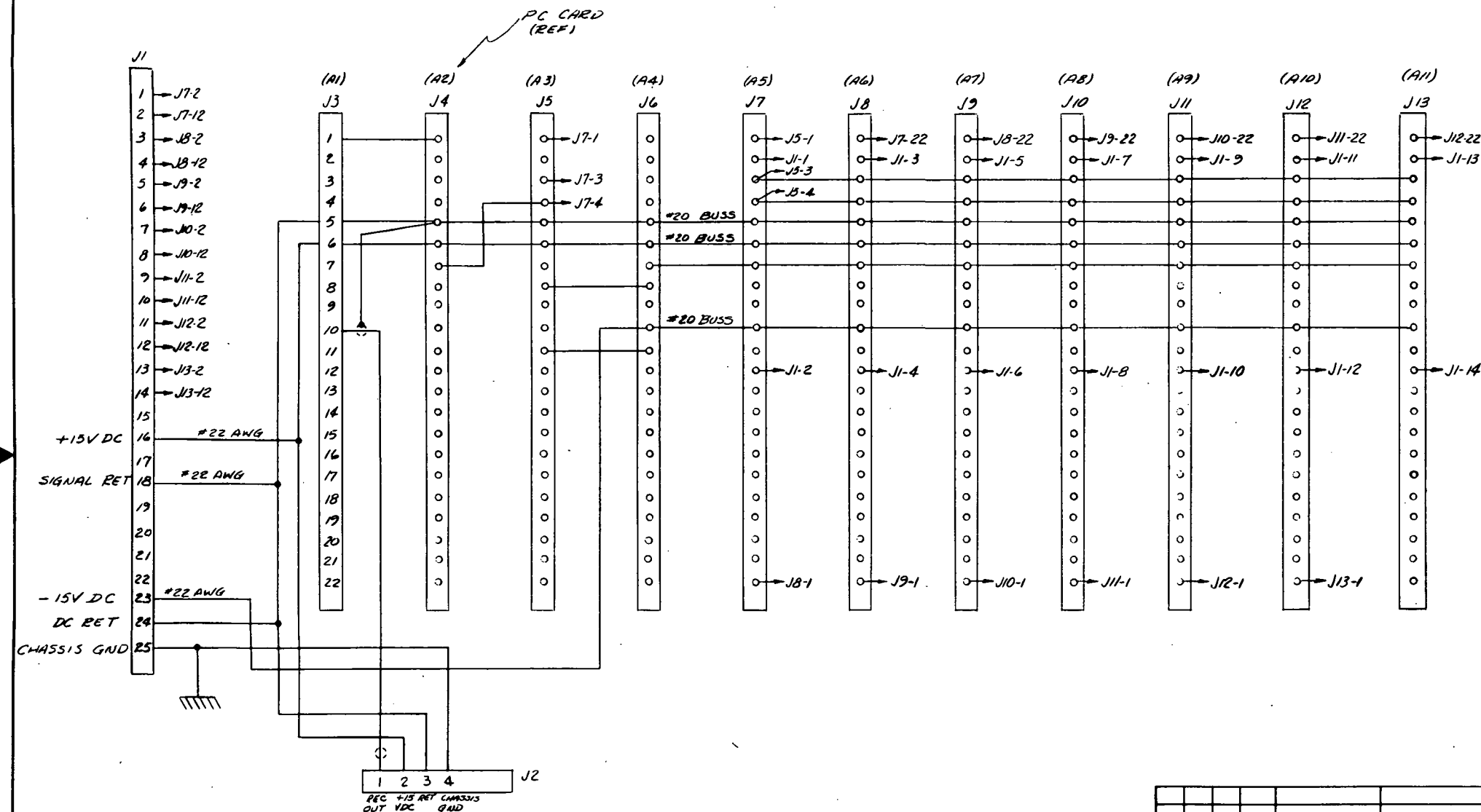
TERMINAL BOARD 3

Figure 7

FOLDOUT FRAME 1

FOLDOUT FRAME

2



1. ALL WIRES 26 GA. UNLESS OTHERWISE STATED

NOTE:-

SCHEMATICS (REF)

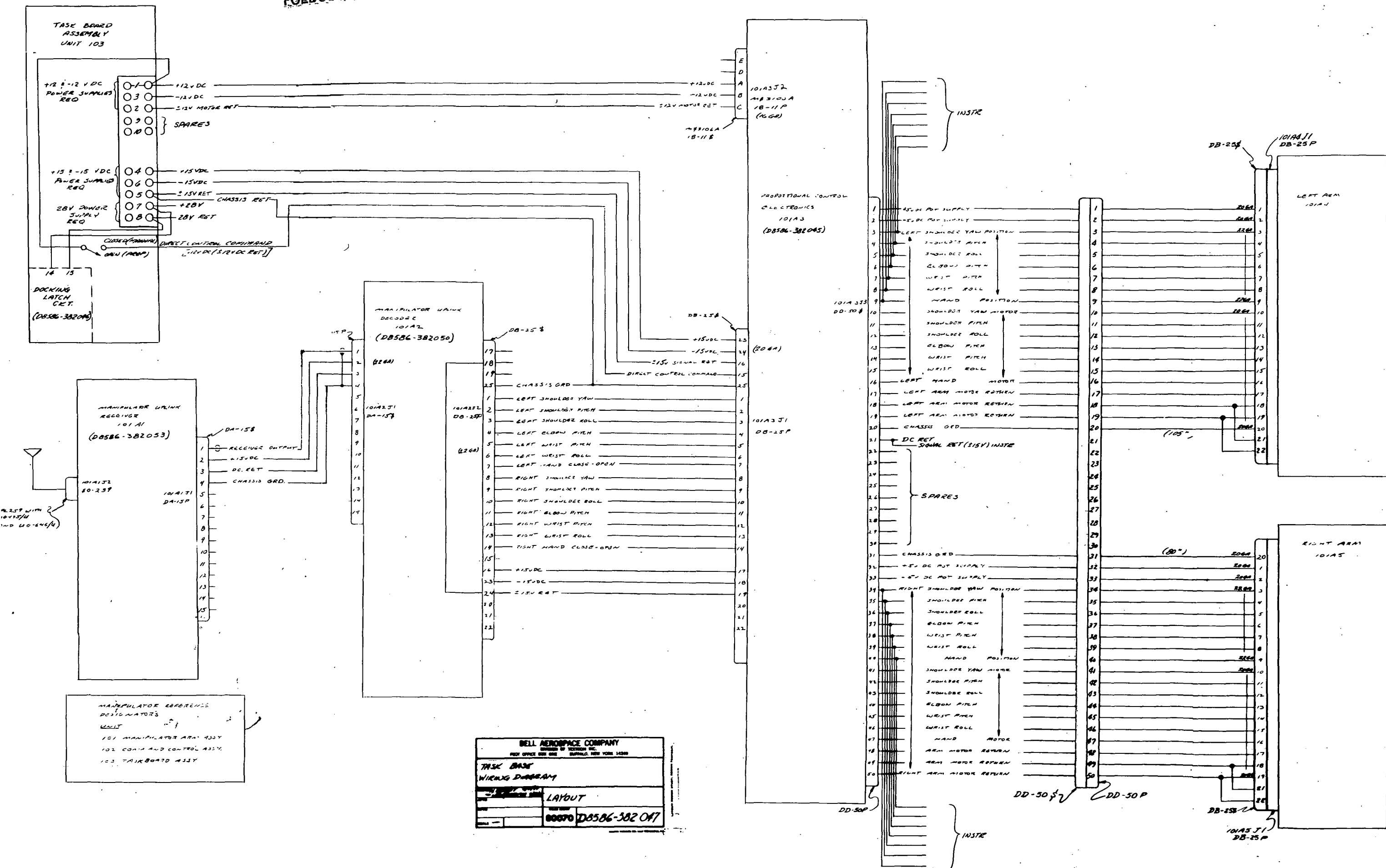
P.C. CHRD A1 - D8586-38205A
A2 | | 057
A3 | | 058
A4 | | 059
45 THRU HII - D8586-382060

[illegible]

2004-38250

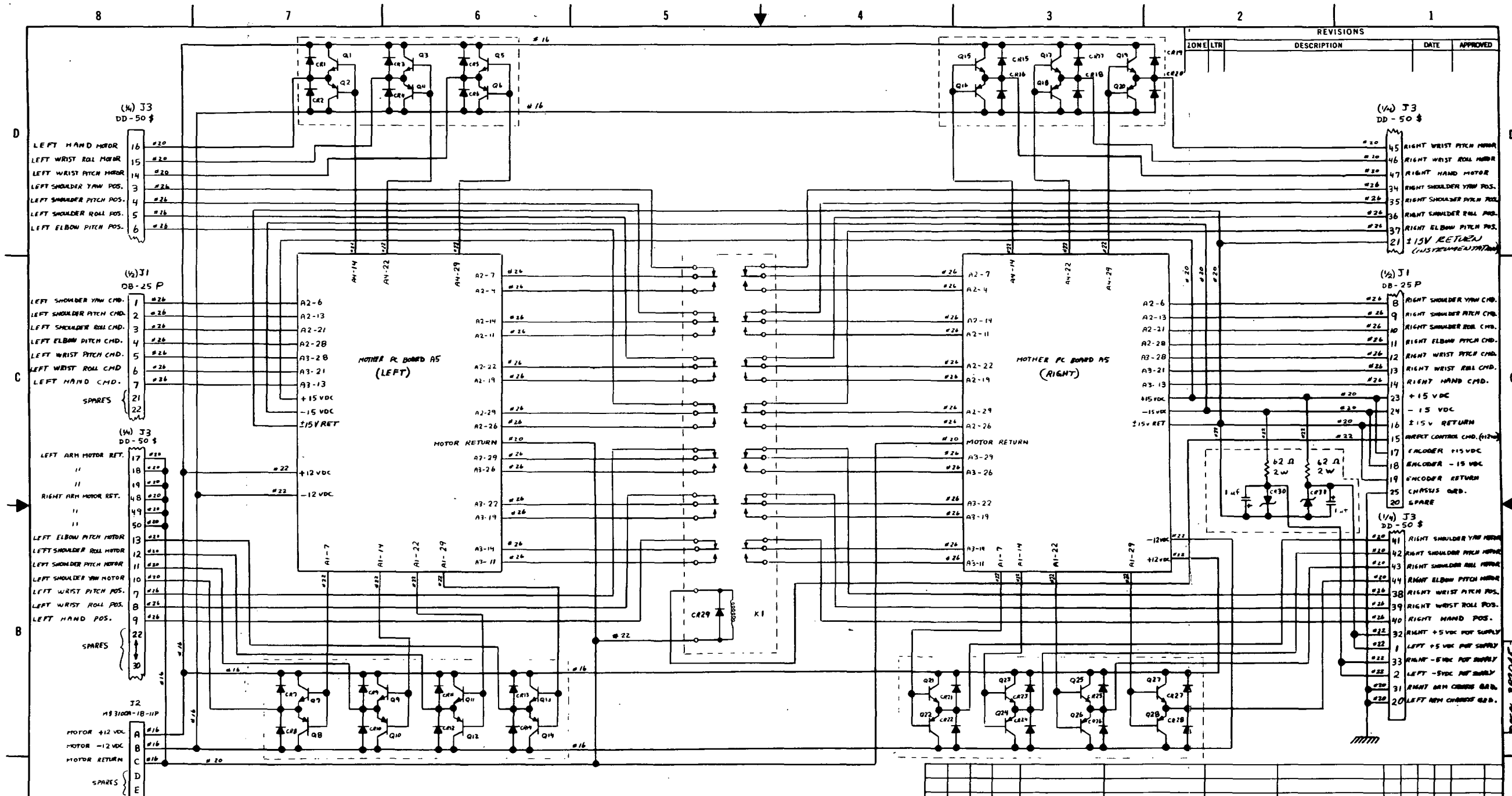
1

2



FOLDOUT FRAME 1

FOLDOUT FRAME 2



- NOTES:**

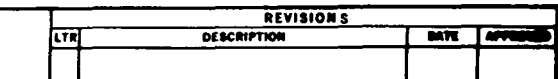
- ① CR1 - CR29 ARE IN4003
- ② CR30 - CR31 ARE IN53388
- ③ Q1, 3 + ... ODD # ARE 2N3055
- ④ Q2, 4 + ... EVEN # ARE MJ2901
- ⑤ USE AWG. WIRE SIZES SHOWN

[illegible][illegible]

HOLE TOLERANCES EXCEPT AS SHOWN	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ON DECIMALS:	DWN GR	100 5-12-71	BELL AEROSPACE COMPANY DIVISION OF TETTER INC. POST OFFICE BOX ONE MURFreesboro, TENN 37050
.013 TO .039 +.004 - .001	X .XX .XXX ANGLES: ±.1 .00 .010 ±0° 30'	APVD		MASTER/SLAVE PROPORTIONAL CONTROL CHASSIS WIRING
.040 TO .129 +.005 - .001		WT		
.130 TO .250 +.008 - .001	UNLESS OTHERWISE SPECIFIED:	CHK		
.251 TO .485 +.008 - .001	- BREAK EDGES .015 MAX RAD OR CHAMFER	STRESS		
.486 TO .725 +.010 - .001	- DIMENSIONING IS PER DIN	RLSE		
.726 TO .925 +.010 - .001		CONTR		

738 TO 385		* 012 - 001		- MACHINED SURFACES		SIZE		CODE IDENT NO		DRAWING NO	
385 AND LARGER		* 010		✓		D		80070		D8586 - 382045	
ED TO COMPLETE PRINT						SCALE				SHEET	
ED NO		ED NO		ED NO		ED NO					

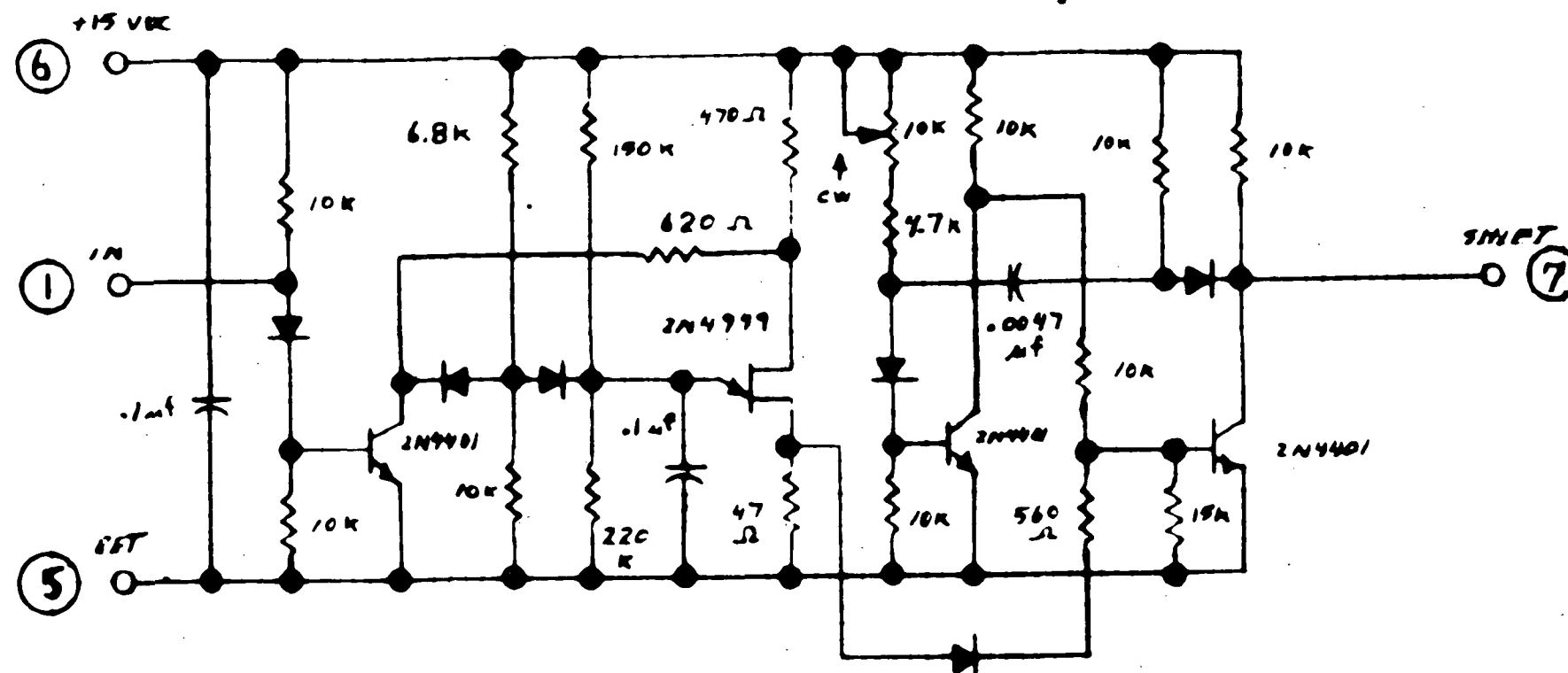
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PC CARD A1 - D8586-382055
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A4 | 063
A5 | 064
A6 THRU A8 - D8586-382056

NOTE:-

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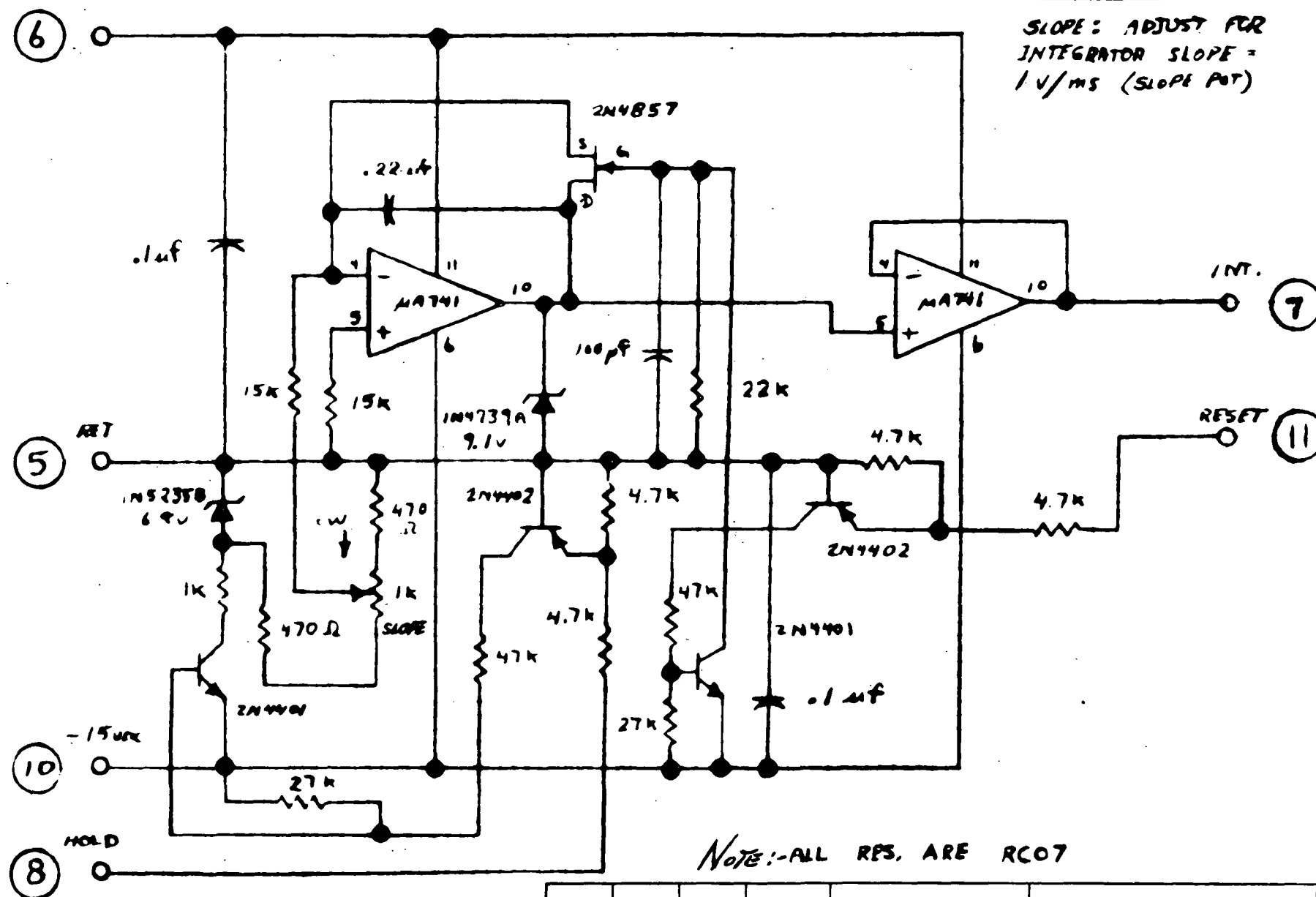


ALL RIS ARE ACOT
ALL DADS IN 9MB

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PARTS LIST

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EO NO.		SH OF SH												CHK <i>gmm</i>											
EO TO COMPLETE PRINT				NUMBER		APPLICATION								STRESS		MANIPULATOR - DECODER									
HOLE TOLERANCES EXCEPT AS SHOWN				APPLICABLE SPECIFICATIONS										WT		BOARD-A2									
.040 TO .129 + .005 - .000				UNLESS OTHERWISE SPECIFIED BREAK ALL SHARP EDGES APPROX .015 R OR CHAMFER										REL											
.130 TO .250 + .006 - .000																CONTR NO.									
.251 TO .485 + .008 - .000																									
.486 TO .735 + .010 - .000																									
.736 TO .985 + .012 - .000				MACHINED SURFACES EXCEPT AS NOTED ✓				DASH NO.		NEXT ASSY		USED ON		NEXT ASSY		FINAL ASSY		SUPERSEDED BY		SIZE		CODE IDENT NO.			
.986 AND LARGER ± .010																				B		80070		D8586-382057	
										APPLICATION		QTY REQD						SCALE		—				SHEET	



SLOPE: ADJUST FOR
INTEGRATOR SLOPE =
1 V/ms (SLOPE POT)

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

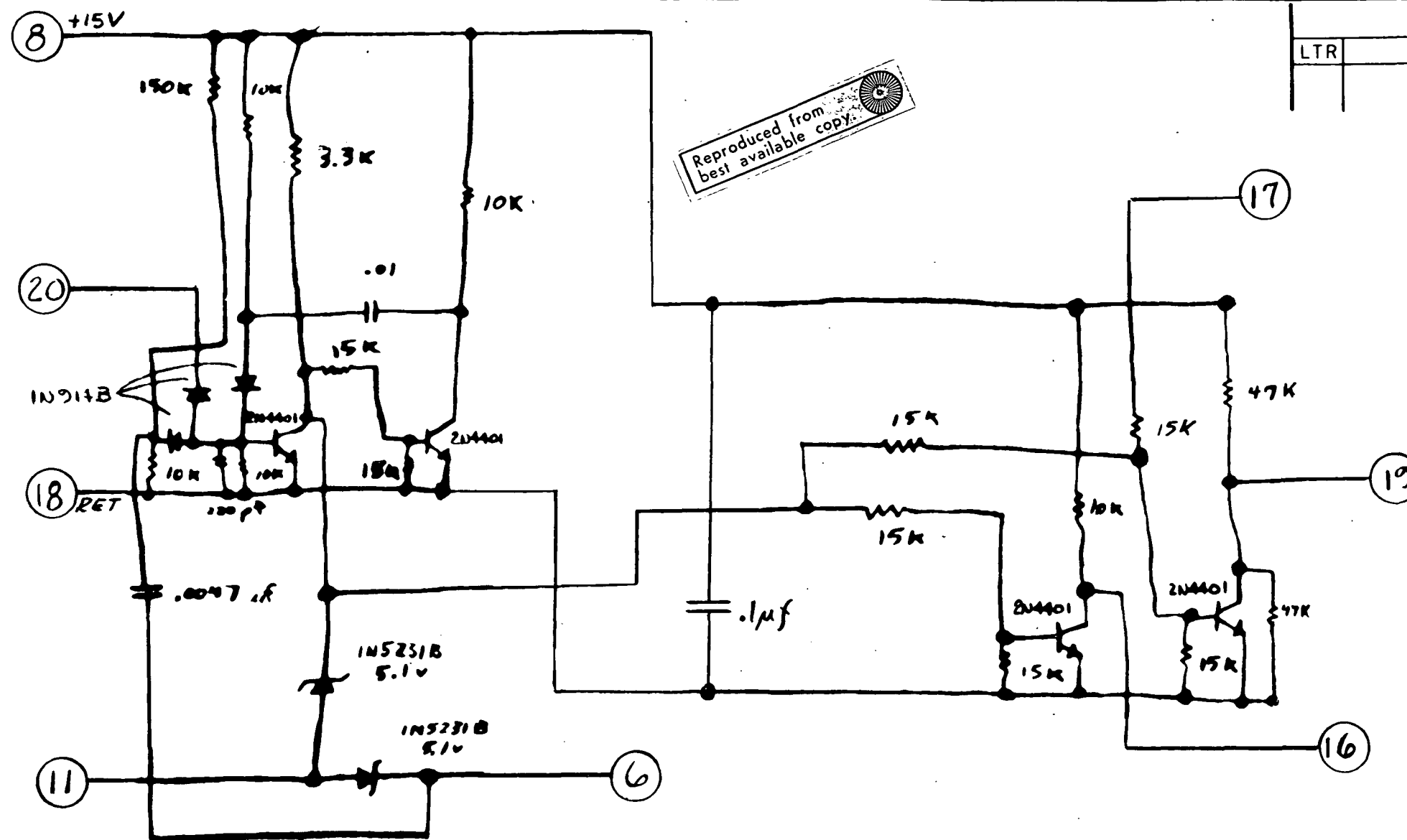
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PARTS LIST

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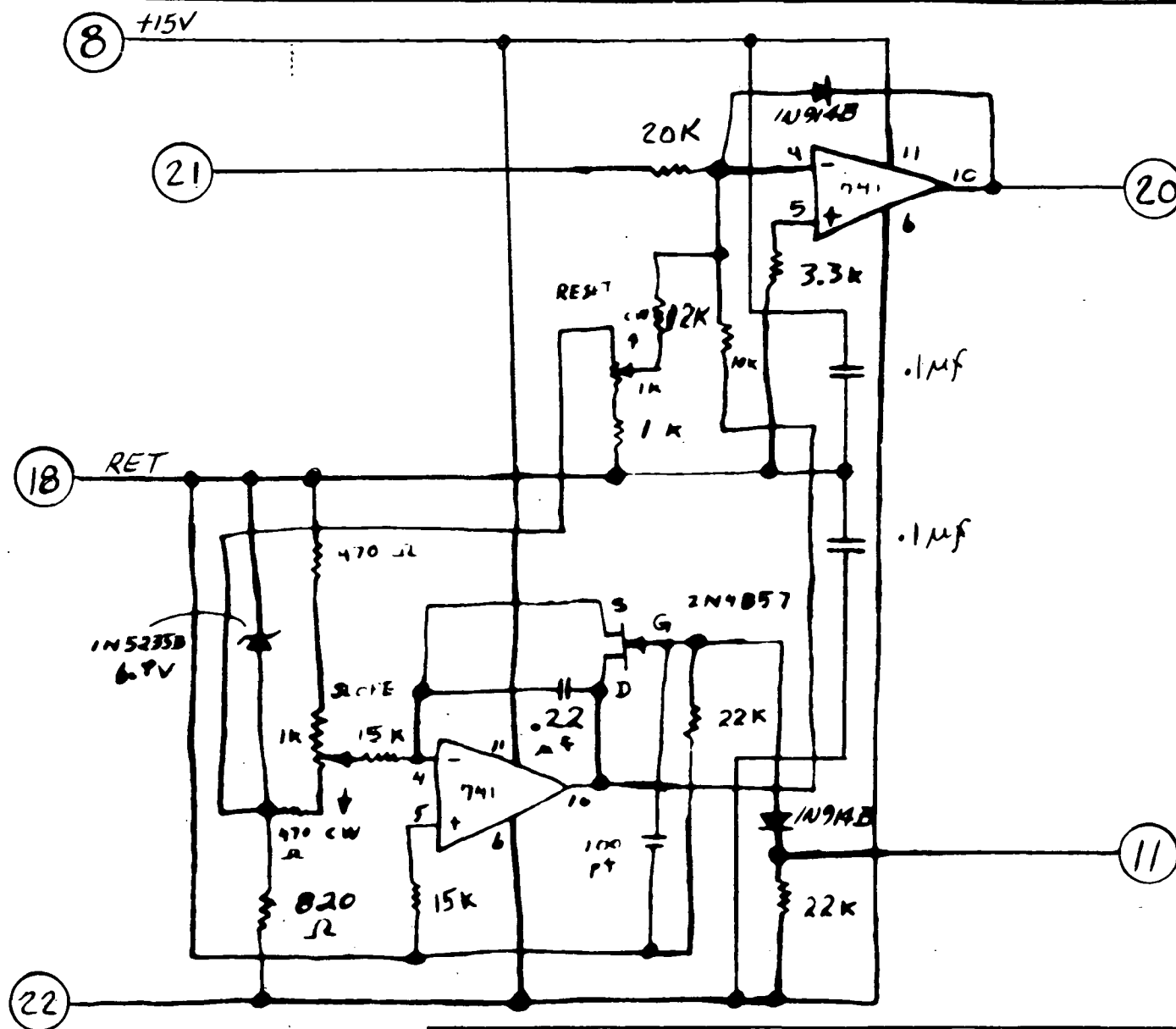
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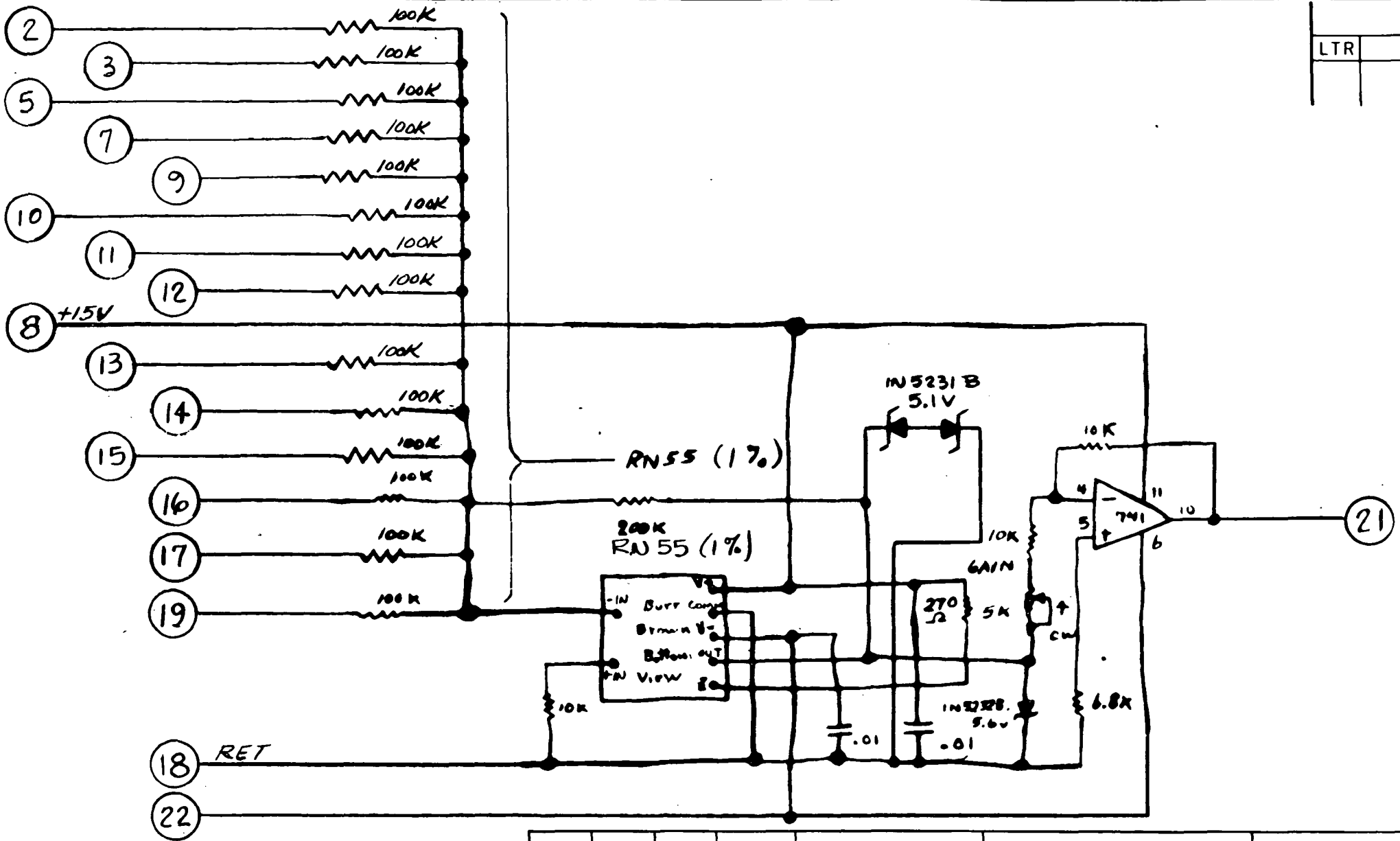


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LTR	DESCRIPTION	DATE	APPROVED

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REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

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.130 TO .250 +.006, -.000				WT	MANIPULATOR ENCODER
.251 TO .485 +.008, -.000				REL	BOARD A5
.486 TO .735 +.010, -.000				CONTR NO.	
.736 TO .985 +.012, -.000					SIZE CODE IDENT NO.
986 AND LARGER ±.010					B 80070 D8586-382064
					SCALE — SHEET

FOLDOUT FRAME 1

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FOLDOUT FRAME 2

